Our GitHub Repository
https://github.com/sabinakou/158francissabina
Our data set:
https://archive.ics.uci.edu/ml/datasets/Automobile

1. Symboling: the process in which cars are assigned a risk factor associated with price
2. Normalized-losses: continuous from 65 to 256
3. Make: alfa-romeo, audi, bmw, chevrolet, dodge, honda, isuzu, jaguar, mazda, mercedes-benz, mercury, mitsubishi, nissan, peugot, plymouth, porsche, renault, saab, subaru, toyota, volkswagen, volvo, diesel, gas
4. Fuel-type: diesel, gas
5. Aspiration: std, turbo
6. Num-of-doors: four, two
7. Body-style: hardtop, wagon, sedan, hatchback, convertible
8. Drive-wheels: 4wd, fwd, rwd
9. Engine-location: front, rear
10. Wheel-base: continuous from 86.6 120.9
11. Length: continuous from 141.1 to 208.1
12. Width: continuous from 60.3 to 72.3
13. Height: continuous from 47.8 to 59.8
14. Curb-weight: weight of the car without any people or baggage, continuous from 1488 to 4066
15. Engine-type: dohc, dohcv, l, ohc, ohcf, ohcv, rotor
16. Num-of-cylinders: number of cylinders, eight, five, four, six, three, twelve, two
17. Engine-size: continuous from 61 to 326
18. Fuel-system: types of fuel injections or carburetors, 1bbl, 2bbl, 4bbl, idi, mfi, mpfi, spdi, spfi
19. Bore: the diameter of the cylinder that the piston travels in, continuous from 2.54 to 3.94
20. Stroke: a part of the piston's cycle, continuous from 2.07 to 4.17

21. Compression-ratio: the ratio of the volume of the cylinder and the combustion chamber when the piston is at the bottom, and the volume of the combustion chamber when the piston is at the top, continuous from 7 to 23

22. Horsepower: continuous from 48 to 288

23. Peak-rpm: peak revolutions per minute, continuous from 4150 to 6600

24. City-mpg: continuous from 13 to 49

25. Highway-mpg: continuous from 16 to 54

26. Price: continuous from 5118 to 45400

The observational units in this data set are the cars.

```
## Installing package into '/home/CAMPUS/fsna2017/R/x86_64-redhat-linux-gnu-library/3.4'
## (as 'lib' is unspecified)
## Loading required package:  ggplot2
```

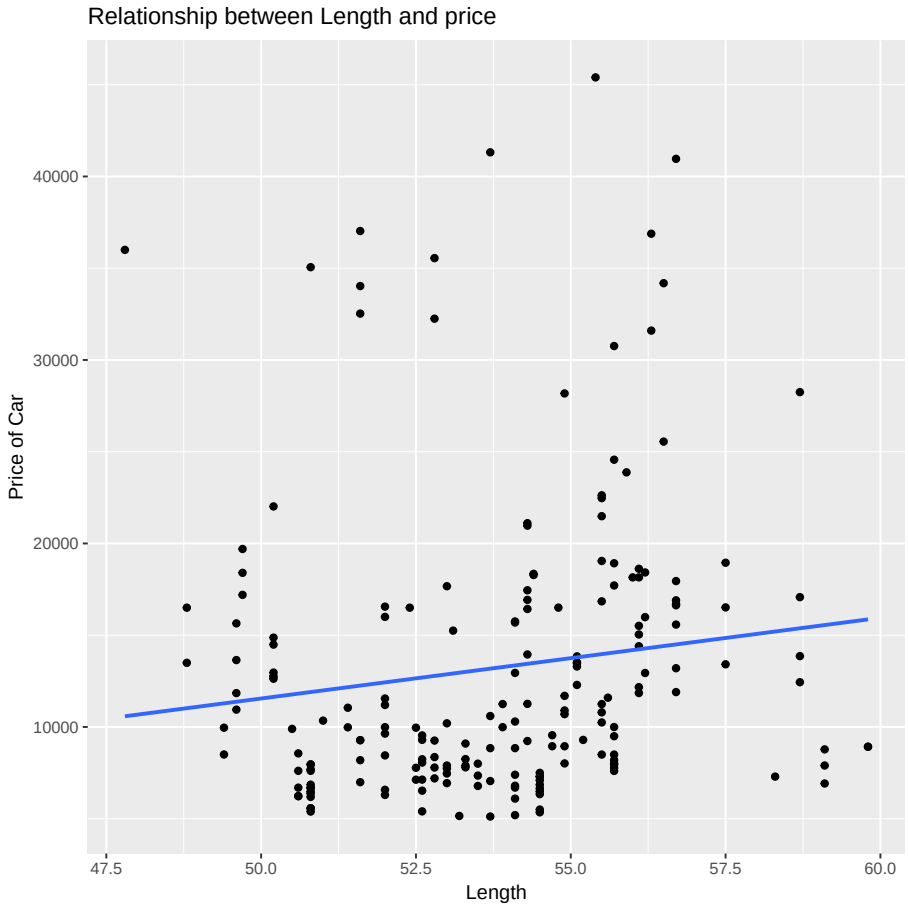
	column	n	mean	sd	median	trimmed
1	Symboling	205	8.341463e-01	1.2453068	1.00	8.121212e-01
2	Normalized-Losses	164	1.220000e+02	35.4421675	115.00	1.195076e+02
3	Make*	205	1.319512e+01	6.2748311	13.00	1.348485e+01
4	Fuel_Type*	205	1.902439e+00	0.2974465	2.00	2.000000e+00
5	Aspiration*	205	1.180488e+00	0.3855347	1.00	1.103030e+00
6	Num-of-doors*	203	1.438424e+00	0.4974206	1.00	1.423313e+00
7	Body-style*	205	3.614634e+00	0.8590810	4.00	3.642424e+00
8	Drive-wheels*	205	2.326829e+00	0.5561706	2.00	2.339394e+00
9	Engine-location*	205	1.014634e+00	0.1203772	1.00	1.000000e+00
10	Wheel-base	205	9.875659e+01	6.0217757	97.00	9.808485e+01
11	Length	205	1.740493e+02	12.3372885	173.20	1.737861e+02
12	Width	205	6.590780e+01	2.1452039	65.50	6.565576e+01
13	Height	205	5.372488e+01	2.4435220	54.10	5.369879e+01
14	Curb-weight	205	2.555566e+03	520.6802035	2414.00	2.513048e+03
15	Engine-type*	205	4.014634e+00	1.0547653	4.00	4.042424e+00
16	Num-of-cylinders*	205	3.117073e+00	0.7957924	3.00	3.060606e+00
17	Engine-size	205	1.269073e+02	41.6426934	120.00	1.205818e+02
18	Fuel-system*	205	4.253659e+00	2.0132037	6.00	4.315152e+00
19	Bore	201	3.329751e+00	0.2735387	3.31	3.326522e+00
20	Stroke	201	3.255423e+00	0.3167175	3.29	3.277081e+00
21	Compression-ratio	205	1.014254e+01	3.9720403	9.00	9.036485e+00
22	Horsepower	203	1.042562e+02	39.7143688	95.00	9.922086e+01
23	Peak-rpm	203	5.125369e+03	479.3345598	5200.00	5.126687e+03
24	City-mpg	205	2.521951e+01	6.5421417	24.00	2.475758e+01
25	Highway-mpg	205	3.075122e+01	6.8864431	30.00	3.040000e+01
26	Price	201	1.320713e+04	7947.0663419	10295.00	1.167694e+04

```
##            mad     min      max   range        skew     kurtosis
## 1     1.482600   -2.00     3.00     5.0  0.20799345 -0.711506602
## 2    35.582400   65.00   256.00   191.0  0.75202161  0.430966504
## 3     8.895600    1.00    22.00    21.0 -0.24110253 -1.204138000
## 4     0.000000    1.00     2.00     1.0 -2.69275934  5.276764474
## 5     0.000000    1.00     2.00     1.0  1.64941619  0.724177602
## 6     0.000000    1.00     2.00     1.0  0.24636305 -1.948832727
## 7     1.482600    1.00     5.00     4.0 -0.65559644  0.931452082
## 8     0.000000    1.00     3.00     2.0 -0.05750113 -0.712477533
## 9     0.000000    1.00     2.00     1.0  8.02474469 62.702464233
## 10    4.003020   86.60   120.90    34.3  1.03489477  0.924703927
## 11   10.229940  141.10   208.10    67.0  0.15367894 -0.138139228
## 12    2.075640   60.30    72.30    12.0  0.89081720  0.621026818
## 13    2.372160   47.80    59.80    12.0  0.06220199 -0.486886313
## 14  572.283600 1488.00  4066.00  2578.0  0.67145894 -0.099448358
## 15    0.000000    1.00     7.00     6.0 -0.52778999  3.125097741
## 16    0.000000    1.00     7.00     6.0  2.11297529 10.660591557
## 17   34.099800   61.00   326.00   265.0  1.91924547  5.068730606
## 18    1.482600    1.00     8.00     7.0 -0.23945050 -1.655864612
## 19    0.385476    2.54     3.94     1.4  0.01971776 -0.859628185
## 20    0.252042    2.07     4.17     2.1 -0.67296016  1.943739534
## 21    0.593040    7.00    23.00    16.0  2.57277897  4.998551928
## 22   37.065000   48.00   288.00   240.0  1.37053992  2.475353666
## 23  444.780000 4150.00  6600.00  2450.0  0.07215793 -0.004004726
## 24    7.413000   13.00    49.00    36.0  0.65402287  0.501096202
## 25    7.413000   16.00    54.00    38.0  0.53212049  0.367191202
## 26 4901.475600 5118.00 45400.00 40282.0  1.78275485  3.061241412
##              se
## 1    0.08697600
## 2    2.76756832
## 3    0.43825322
## 4    0.02077456
## 5    0.02692691
## 6    0.03491208
## 7    0.06000082
## 8    0.03884464
## 9    0.00840751
## 10   0.42057906
## 11   0.86167361
## 12   0.14982754
## 13   0.17066298
## 14  36.36588285
## 15   0.07366801
## 16   0.05558055
## 17   2.90845187
```

```
## 18   0.14060824
## 19   0.01929393
## 20   0.02233953
## 21   0.27741933
## 22   2.78740224
## 23  33.64269076
## 24   0.45692299
## 25   0.48097005
## 26 560.54284032
```

Evidently there's a large correlation between the curb weight of a car and its price. The data points with large residuals towards the higher end in curb weight indicate that the incredibly heavy cars tend to, not surprisingly, cost significantly more.

```
ggplot(imports_85, aes(x = imports_85[,13], imports_85[,26])) +
geom_point() +
labs(x = "Length", y = "Price of Car",
title = "Relationship between Length and price") +
geom_smooth(method = "lm", se = FALSE)
```




```
 theme_bw()

## List of 57
##  $ line                :List of 6
##   ..$ colour       : chr "black"
##   ..$ size         : num 0.5
##   ..$ linetype     : num 1
##   ..$ lineend      : chr "butt"
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
```

```
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ rect                :List of 5
##   ..$ fill         : chr "white"
##   ..$ colour       : chr "black"
##   ..$ size         : num 0.5
##   ..$ linetype     : num 1
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ text                :List of 11
##   ..$ family       : chr ""
##   ..$ face         : chr "plain"
##   ..$ colour       : chr "black"
##   ..$ size         : num 11
##   ..$ hjust        : num 0.5
##   ..$ vjust        : num 0.5
##   ..$ angle        : num 0
##   ..$ lineheight   : num 0.9
##   ..$ margin       :Classes 'margin', 'unit'  atomic [1:4] 0 0 0 0
##   .. .. ..- attr(*, "valid.unit")= int 8
##   .. .. ..- attr(*, "unit")= chr "pt"
##   ..$ debug        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.title.x        :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       :Classes 'margin', 'unit'  atomic [1:4] 5.5 0 0 0
##   .. .. ..- attr(*, "valid.unit")= int 8
##   .. .. ..- attr(*, "unit")= chr "pt"
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.title.x.top    :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 0
```

```
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       :Classes 'margin', 'unit'  atomic [1:4] 0 0 5.5 0
##   .. .. ..- attr(*, "valid.unit")= int 8
##   .. .. ..- attr(*, "unit")= chr "pt"
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.title.y         :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 1
##   ..$ angle        : num 90
##   ..$ lineheight   : NULL
##   ..$ margin       :Classes 'margin', 'unit'  atomic [1:4] 0 5.5 0 0
##   .. .. ..- attr(*, "valid.unit")= int 8
##   .. .. ..- attr(*, "unit")= chr "pt"
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.title.y.right   :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 0
##   ..$ angle        : num -90
##   ..$ lineheight   : NULL
##   ..$ margin       :Classes 'margin', 'unit'  atomic [1:4] 0 0 0 5.5
##   .. .. ..- attr(*, "valid.unit")= int 8
##   .. .. ..- attr(*, "unit")= chr "pt"
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text            :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : chr "grey30"
##   ..$ size         :Class 'rel'  num 0.8
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
```

```
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.x          :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       :Classes 'margin', 'unit'  atomic [1:4] 2.2 0 0 0
##   .. .. ..- attr(*, "valid.unit")= int 8
##   .. .. ..- attr(*, "unit")= chr "pt"
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.x.top      :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : num 0
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       :Classes 'margin', 'unit'  atomic [1:4] 0 0 2.2 0
##   .. .. ..- attr(*, "valid.unit")= int 8
##   .. .. ..- attr(*, "unit")= chr "pt"
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.y          :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 1
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
```

```
##   ..$ margin       :Classes 'margin', 'unit'  atomic [1:4] 0 2.2 0 0
##   .. .. ..- attr(*, "valid.unit")= int 8
##   .. .. ..- attr(*, "unit")= chr "pt"
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.text.y.right    :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 0
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       :Classes 'margin', 'unit'  atomic [1:4] 0 0 0 2.2
##   .. .. ..- attr(*, "valid.unit")= int 8
##   .. .. ..- attr(*, "unit")= chr "pt"
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ axis.ticks           :List of 6
##   ..$ colour       : chr "grey20"
##   ..$ size         : NULL
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ axis.ticks.length    :Class 'unit'  atomic [1:1] 2.75
##   .. ..- attr(*, "valid.unit")= int 8
##   .. ..- attr(*, "unit")= chr "pt"
##  $ axis.line            : list()
##   ..- attr(*, "class")= chr [1:2] "element_blank" "element"
##  $ axis.line.x          : NULL
##  $ axis.line.y          : NULL
##  $ legend.background    :List of 5
##   ..$ fill         : NULL
##   ..$ colour       : logi NA
##   ..$ size         : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ legend.margin        :Classes 'margin', 'unit'  atomic [1:4] 0.2 0.2 0.2 0.2
##   .. ..- attr(*, "valid.unit")= int 1
```

```
##   .. ..- attr(*, "unit")= chr "cm"
##  $ legend.spacing       :Class 'unit'  atomic [1:1] 0.4
##   .. ..- attr(*, "valid.unit")= int 1
##   .. ..- attr(*, "unit")= chr "cm"
##  $ legend.spacing.x     : NULL
##  $ legend.spacing.y     : NULL
##  $ legend.key           :List of 5
##   ..$ fill         : chr "white"
##   ..$ colour       : logi NA
##   ..$ size         : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ legend.key.size      :Class 'unit'  atomic [1:1] 1.2
##   .. ..- attr(*, "valid.unit")= int 3
##   .. ..- attr(*, "unit")= chr "lines"
##  $ legend.key.height    : NULL
##  $ legend.key.width     : NULL
##  $ legend.text          :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         :Class 'rel'  num 0.8
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ legend.text.align    : NULL
##  $ legend.title         :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : num 0
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
```

```
##  $ legend.title.align   : NULL
##  $ legend.position      : chr "right"
##  $ legend.direction     : NULL
##  $ legend.justification : chr "center"
##  $ legend.box           : NULL
##  $ legend.box.margin    :Classes 'margin', 'unit'  atomic [1:4] 0 0 0 0
##   .. ..- attr(*, "valid.unit")= int 1
##   .. ..- attr(*, "unit")= chr "cm"
##  $ legend.box.background: list()
##   ..- attr(*, "class")= chr [1:2] "element_blank" "element"
##  $ legend.box.spacing   :Class 'unit'  atomic [1:1] 0.4
##   .. ..- attr(*, "valid.unit")= int 1
##   .. ..- attr(*, "unit")= chr "cm"
##  $ panel.background     :List of 5
##   ..$ fill         : chr "white"
##   ..$ colour       : logi NA
##   ..$ size         : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ panel.border         :List of 5
##   ..$ fill         : logi NA
##   ..$ colour       : chr "grey20"
##   ..$ size         : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ panel.spacing        :Class 'unit'  atomic [1:1] 5.5
##   .. ..- attr(*, "valid.unit")= int 8
##   .. ..- attr(*, "unit")= chr "pt"
##  $ panel.spacing.x      : NULL
##  $ panel.spacing.y      : NULL
##  $ panel.grid.major     :List of 6
##   ..$ colour       : chr "grey92"
##   ..$ size         : NULL
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ panel.grid.minor     :List of 6
##   ..$ colour       : chr "grey92"
##   ..$ size         : num 0.25
##   ..$ linetype     : NULL
##   ..$ lineend      : NULL
```

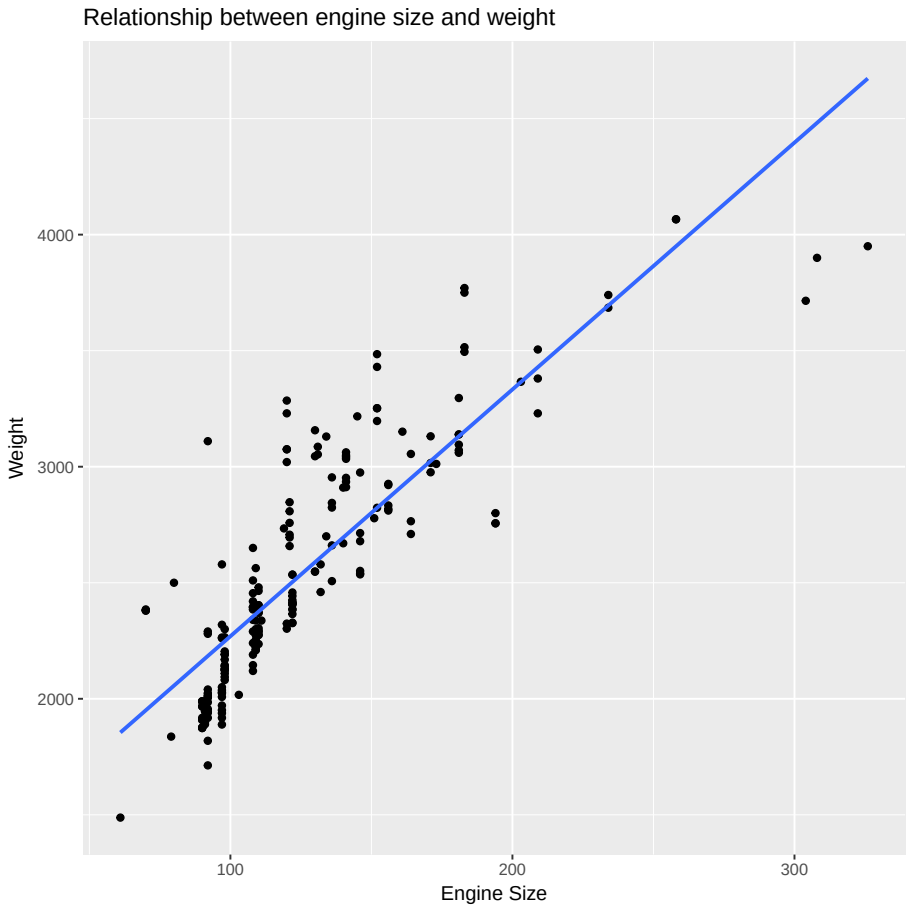
```
##   ..$ arrow        : logi FALSE
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_line" "element"
##  $ panel.ontop          : logi FALSE
##  $ plot.background      :List of 5
##   ..$ fill         : NULL
##   ..$ colour       : chr "white"
##   ..$ size         : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ plot.title           :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         :Class 'rel'  num 1.2
##   ..$ hjust        : num 0
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       :Classes 'margin', 'unit'  atomic [1:4] 0 0 6.6 0
##   .. .. ..- attr(*, "valid.unit")= int 8
##   .. .. ..- attr(*, "unit")= chr "pt"
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.subtitle        :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         :Class 'rel'  num 0.9
##   ..$ hjust        : num 0
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       :Classes 'margin', 'unit'  atomic [1:4] 0 0 4.95 0
##   .. .. ..- attr(*, "valid.unit")= int 8
##   .. .. ..- attr(*, "unit")= chr "pt"
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.caption         :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
```

```
##   ..$ size         :Class 'rel'  num 0.9
##   ..$ hjust        : num 1
##   ..$ vjust        : num 1
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       :Classes 'margin', 'unit'  atomic [1:4] 4.95 0 0 0
##   .. .. ..- attr(*, "valid.unit")= int 8
##   .. .. ..- attr(*, "unit")= chr "pt"
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ plot.margin          :Classes 'margin', 'unit'  atomic [1:4] 5.5 5.5 5.5 5.5
##   .. ..- attr(*, "valid.unit")= int 8
##   .. ..- attr(*, "unit")= chr "pt"
##  $ strip.background     :List of 5
##   ..$ fill         : chr "grey85"
##   ..$ colour       : chr "grey20"
##   ..$ size         : NULL
##   ..$ linetype     : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_rect" "element"
##  $ strip.placement      : chr "inside"
##  $ strip.text           :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : chr "grey10"
##   ..$ size         :Class 'rel'  num 0.8
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       : NULL
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ strip.text.x         :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : NULL
##   ..$ lineheight   : NULL
##   ..$ margin       :Classes 'margin', 'unit'  atomic [1:4] 5.5 0 5.5 0
```

```
##   .. .. ..- attr(*, "valid.unit")= int 8
##   .. .. ..- attr(*, "unit")= chr "pt"
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ strip.text.y         :List of 11
##   ..$ family       : NULL
##   ..$ face         : NULL
##   ..$ colour       : NULL
##   ..$ size         : NULL
##   ..$ hjust        : NULL
##   ..$ vjust        : NULL
##   ..$ angle        : num -90
##   ..$ lineheight   : NULL
##   ..$ margin       :Classes 'margin', 'unit'  atomic [1:4] 0 5.5 0 5.5
##   .. .. ..- attr(*, "valid.unit")= int 8
##   .. .. ..- attr(*, "unit")= chr "pt"
##   ..$ debug        : NULL
##   ..$ inherit.blank: logi TRUE
##   ..- attr(*, "class")= chr [1:2] "element_text" "element"
##  $ strip.switch.pad.grid:Class 'unit'  atomic [1:1] 0.1
##   .. ..- attr(*, "valid.unit")= int 1
##   .. ..- attr(*, "unit")= chr "cm"
##  $ strip.switch.pad.wrap:Class 'unit'  atomic [1:1] 0.1
##   .. ..- attr(*, "valid.unit")= int 1
##   .. ..- attr(*, "unit")= chr "cm"
##  - attr(*, "class")= chr [1:2] "theme" "gg"
##  - attr(*, "complete")= logi TRUE
##  - attr(*, "validate")= logi TRUE
```

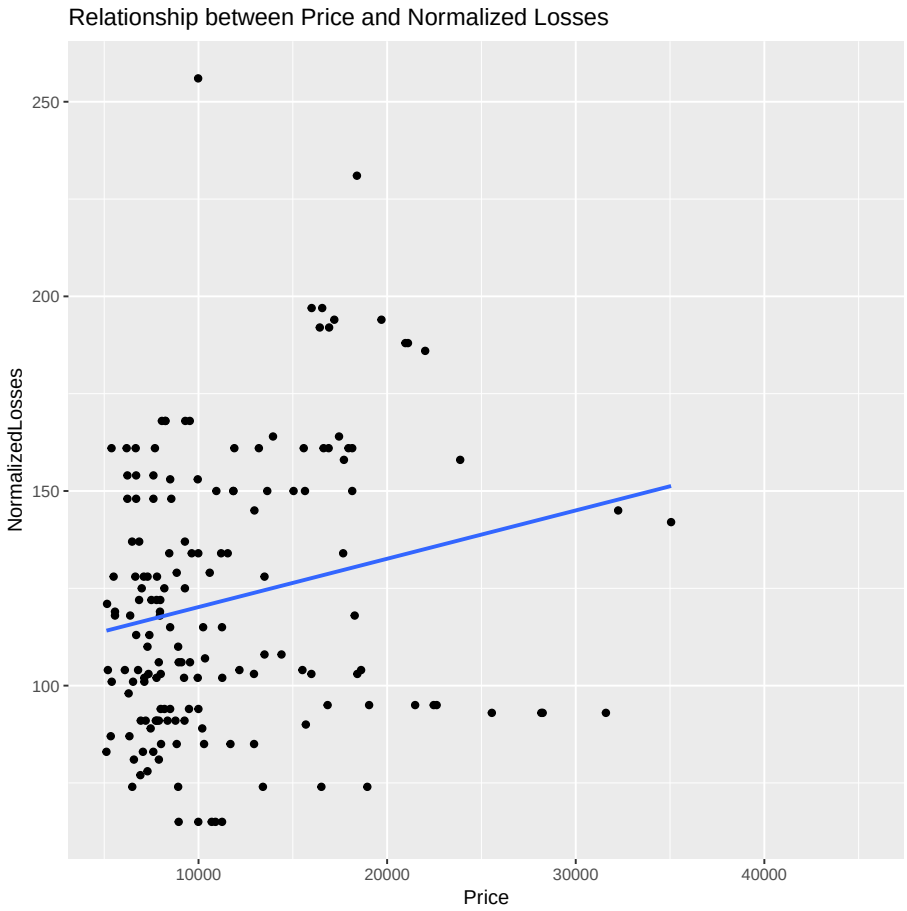
The correlation between length and price isn't as strongly positive as that of curb weight and price but it still exists. There are a number of incredibly expensive cars that are not long however. This relationship between length and price is relatively weak.

```
ggplot(imports_85, aes(x = imports_85[,17], y = imports_85[,14])) +
geom_point() +
labs(x = "Engine Size", y = "Weight",
title = "Relationship between engine size and weight") +
geom_smooth(method = "lm", se = FALSE)
```



In perhapps the most intuitive of all relationships, we see a clear positive correlation between engine size and weight. The larger the engine, the heavier the car–most likely.

```
ggplot(imports_85, aes(x = imports_85[,26], y = imports_85[,2])) +
geom_point() +
labs(x = "Price", y = "NormalizedLosses",
title = "Relationship between Price and Normalized Losses") +
geom_smooth(method = "lm", se = FALSE)
```



In all, this data set has not presented anything particularly suprising. So far, all the relationships we've put together come accross as incredibly intuitive–our sample seems representitive of the the overall population of automobiles.